Sept. 14, 1937. R. C. OSGOOD 2,092,774

HOISTING MECHANISM

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Fig. 1

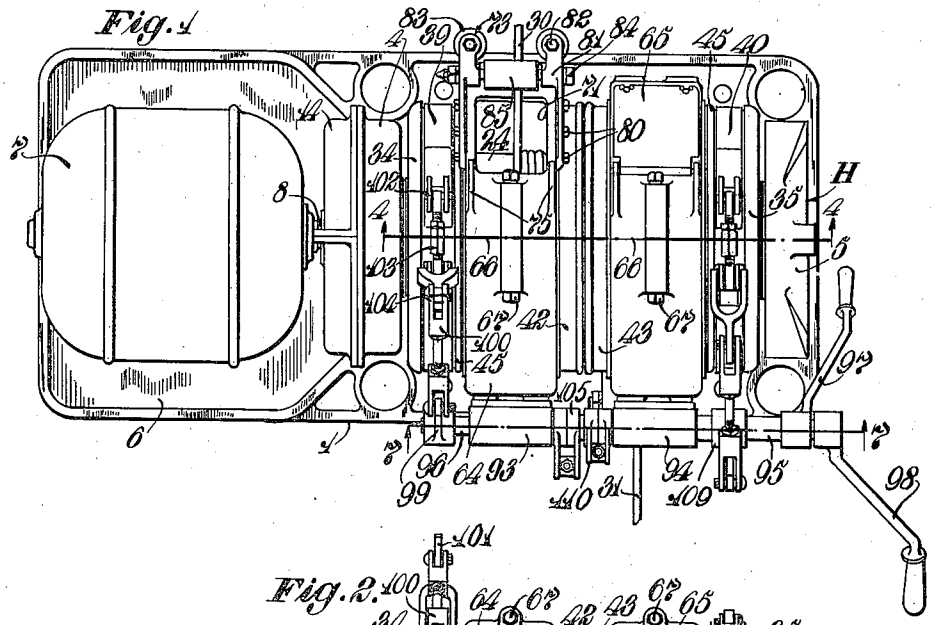


Fig. 2.

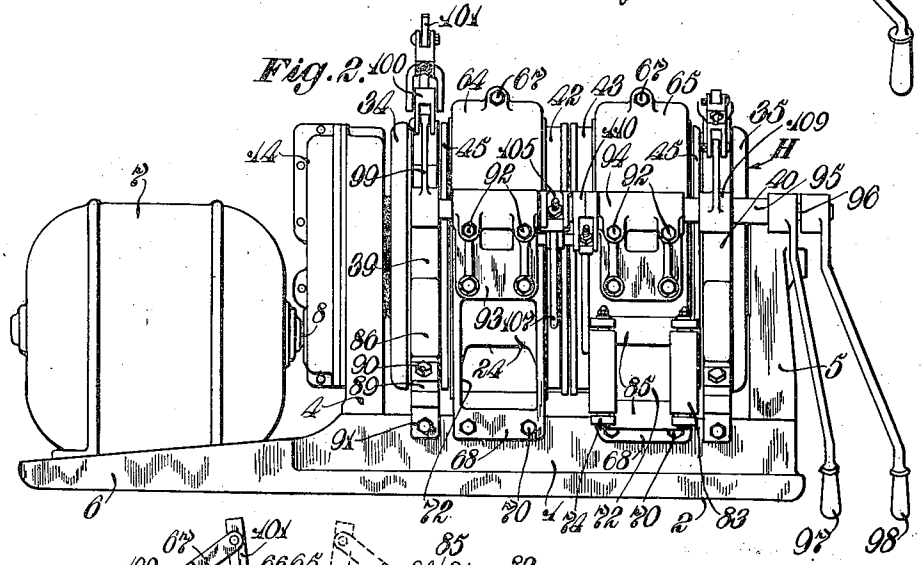
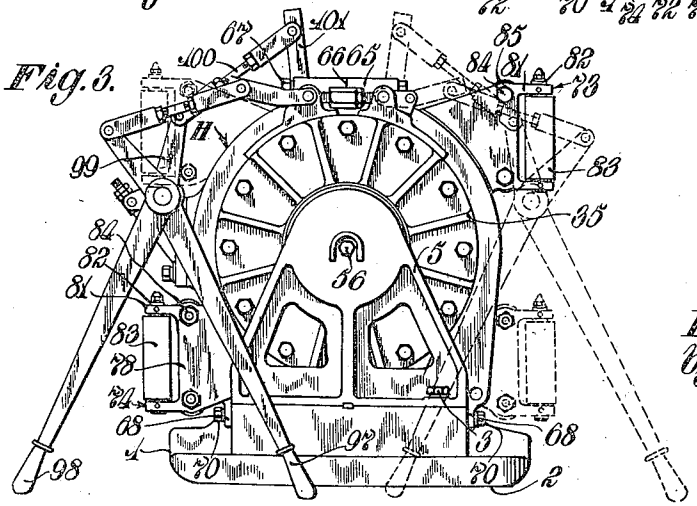


Fig. 3.



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Fig. 4.

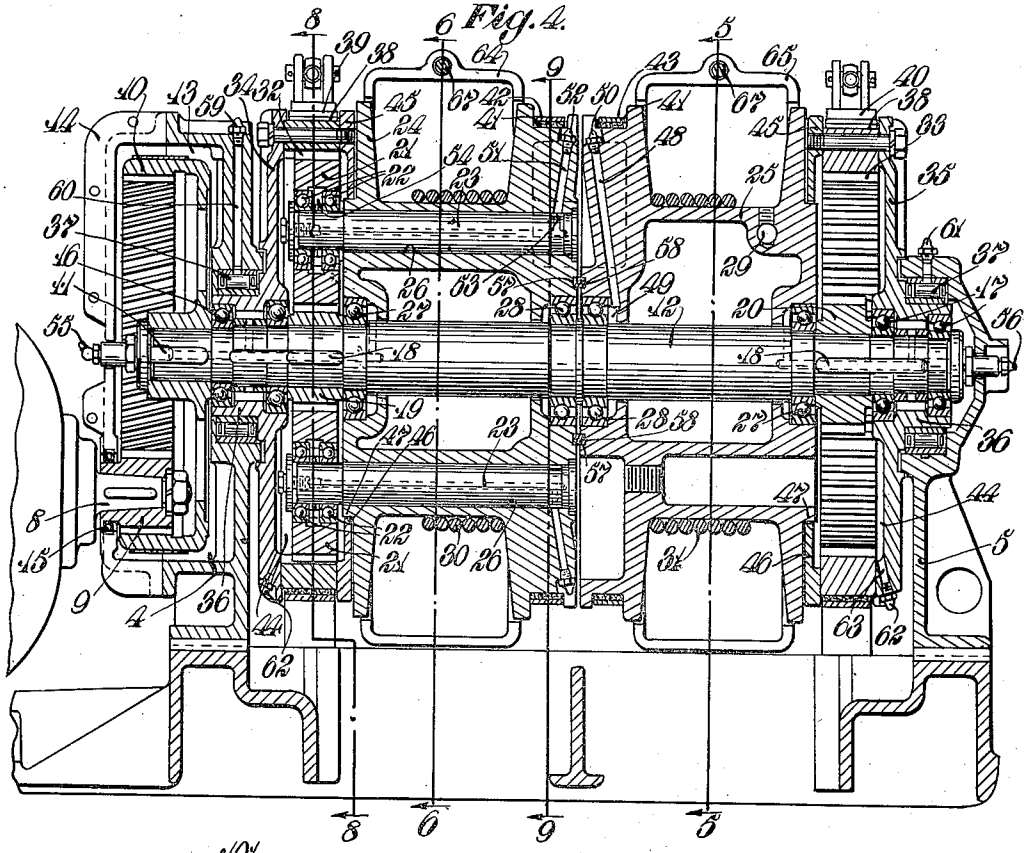


Fig. 5.

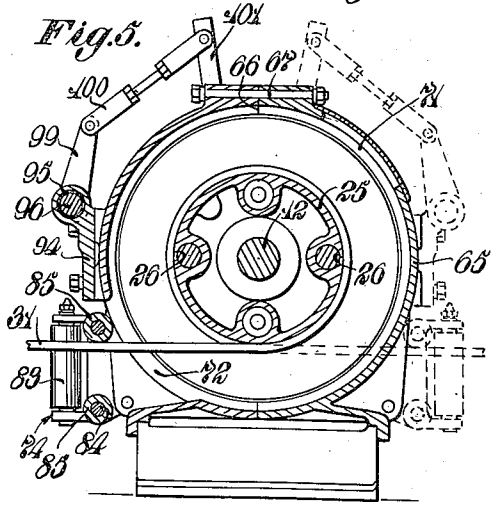


Fig. 6.

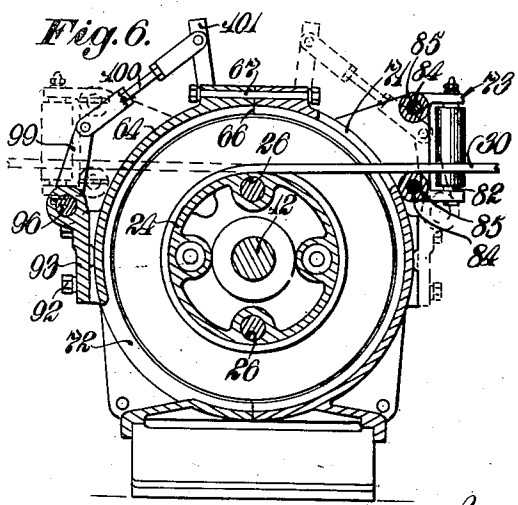
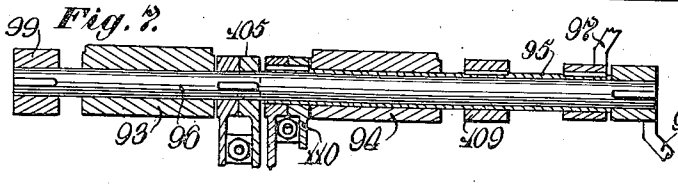


Fig. 7.



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HOISTING MECHANISM

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Fig. 8.

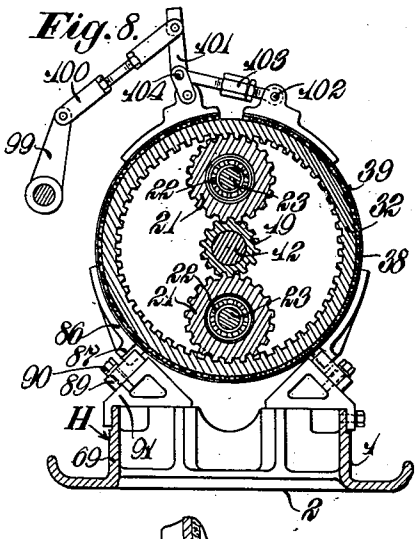


Fig. 9.

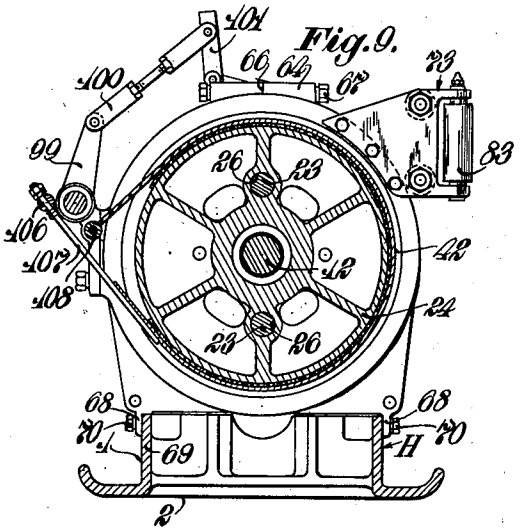


Fig. 10.

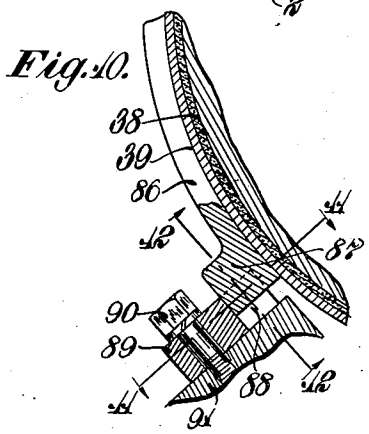


Fig. 11.

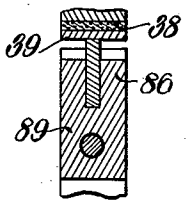


Fig. 12.

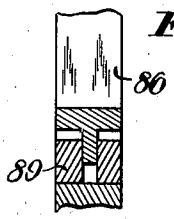


Fig. 14.

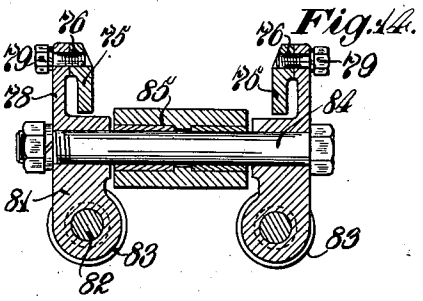
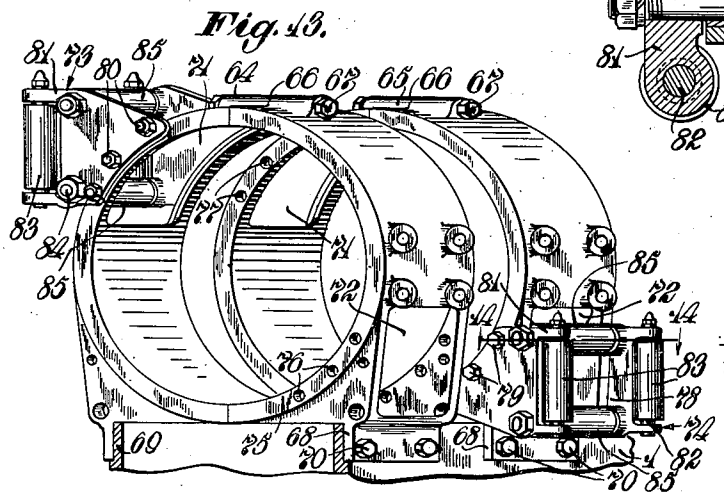


Fig. 13.



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HOISTING MECHANISM

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Fig. 15.

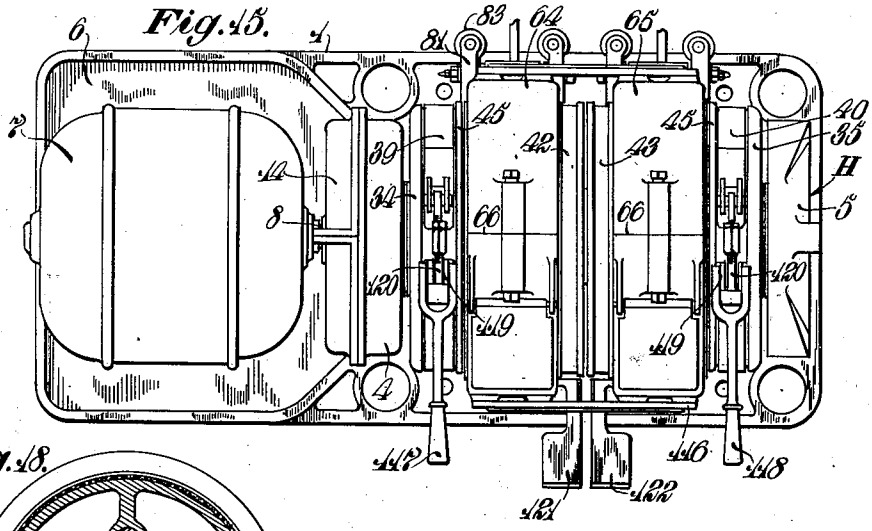


Fig. 18.

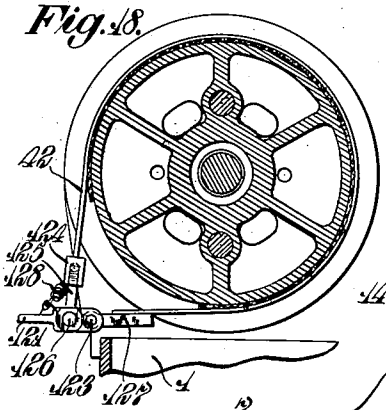


Fig. 16.

Fig. 17.

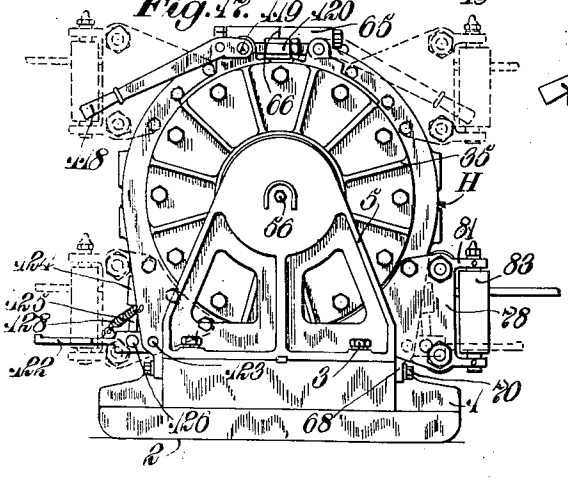
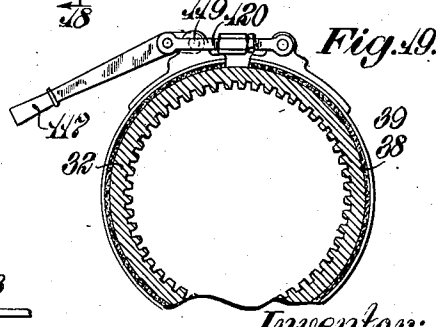


Fig. 19.



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UNITED STATES PATENT OFFICE

2,092,774

HOISTING MECHANISM

Robert C. Osgood, Claremont, N. H., assignor to Sullivan Machinery Company, a corporation of Massachusetts

Application May 14, 1935, Serial No. 21,461

25 Claims. (Cl. 254—185)

This invention relates to hoisting mechanisms, and more particularly, but not exclusively, to improvements in scraper mucking or so-called "slushing" hoists of the double drum type.

In hoisting mechanisms, particularly those of the scraper mucking or so-called "slushing" type, various arrangements of the control elements for the drum drive control means and drum braking means, the rope guards, and the rope guiding means for guiding the haulage ropes with respect to the drums are necessary to meet the numerous requirements of drag scraper work. Under certain conditions, as for instance in loading slide work, end control elements for the drum driving means and drum braking means are desirable, but under other conditions, side control elements are desirable. Also, the rope guards and the rope guiding means must be located in different positions to respectively guard the ropes and guide the haulage ropes with respect to the drums as the ropes are extended from the drums in various manners. Also, it is necessary to provide control elements which may be operated at one time from one side or end of the machine and at another time the other side or machine end, and in certain instances, the motor must be arranged at one end of the drums and in others at the other drum ends. Hitherto, to meet these varied requirements, it was necessary to provide a number of separate hoisting units each designed to meet certain requirements.

A primary object of the present invention is to provide an improved hoisting mechanism particularly adapted for scraper mucking or so-called "slushing" purposes where, by simple transposal and re-arrangement of parts, the various requirements above mentioned may be met by a single hoisting unit. Another object is to provide an improved hoisting mechanism having improved control means for the drum driving means and the drum braking means. Yet another object is to provide an improved rope guiding means for the haulage ropes whereby the haulage ropes may be extended in various manners with respect to the haulage drums. A further object is to provide an improved drum driving gearing and improved lubricating means therefor. A still further object is to provide an improved lubricating means for elements of the drum driving gearing and having embodied therein an improved lubricant seal. Still another object is to provide an improved transposable arrangement for the control elements and the rope guides of a hoisting mechanism of the double drum type. These and other objects and advantages of the invention will, however, hereinafter more fully appear.

In the accompanying drawings there are shown for purposes of illustration one form and several modifications which the invention may assume in practice.

In these drawings,—

Fig. 1 is a plan view of the illustrative form of the improved hoisting mechanism.

Fig. 2 is a side elevational view of the hoisting mechanism shown in Fig. 1.

Fig. 3 is an end elevational view of the improved hoisting mechanism.

Fig. 4 is an enlarged view in longitudinal section taken substantially on line 4—4 of Fig. 1.

Fig. 5 is a cross sectional view taken on line 5—5 of Fig. 4.

Fig. 6 is a cross sectional view taken on line 6—6 of Fig. 4.

Fig. 7 is a detail sectional view taken on line 7—7 of Fig. 1.

Fig. 8 is a cross sectional view taken on line 8—8 of Fig. 4.

Fig. 9 is a cross sectional view taken on line 9—9 of Fig. 4.

Fig. 10 is a detail sectional view showing a portion of the drum braking structure.

Figs. 11 and 12 are detail sectional views taken on lines 11—11 and 12—12 of Fig. 10.

Fig. 13 is a perspective view showing the rope guards and their associated rope guides.

Fig. 14 is a detail sectional view taken on line 14—14 of Fig. 13.

Fig. 15 is a view similar to Fig. 1 showing a modified form of control means for the drum driving and braking elements.

Fig. 16 is a side elevational view of the hoisting mechanism shown in Fig. 15.

Fig. 17 is an end elevational view of the hoisting mechanism shown in Figs. 15 and 16.

Fig. 18 is a cross sectional view taken on line 18—18 of Fig. 16.

Fig. 19 is a cross sectional view taken on line 19—19 of Fig. 16.

In this illustrative construction there is shown a double drum hoist generally designated H of the scraper mucking or so-called "slushing" type having a frame 1 herein in the form of a bottom skid having upturned flanges and a plane bottom surface 2 for supporting the hoist, as, for instance, for slidably supporting the hoisting mechanism over the mine floor, or for permanent association with a loading slide. The frame 1, which herein forms the base of the hoisting mechanism has se-

cured thereto, as by screws 3, upstanding end supports 4 and 5. As shown, mounted on an extension 6 of the base frame 1 is a motor 7 having its power shaft 8 horizontally disposed and extending longitudinally of the hoisting mechanism. Fixed to the motor power shaft 8, as by a key, is a motor pinion 9 herein preferably of the helical type, and this pinion is meshed with an internal helical gear 10 fixed, as by a key at 11, to one end of a longitudinally extending horizontal driving or transmission shaft 12. The end bracket 4 is formed with a recess 13 closed at its outer side by a detachable recessed cover 14, and the recesses in the support 4 and the cover 14 cooperate to form a chamber within which the helical gears 9 and 10 are arranged, and this chamber is adapted to receive a lubricant bath for the gears. Carried by the cover plate 14 is a lubricant seal 15 having a cup leather tightly embracing the hub of the pinion 9 for preventing leakage of lubricant from the gear chamber along the motor power shaft, and the cover 14 is preferably vertically split to permit the removal thereof without disturbing the motor power shaft and pinion. In this instance, the horizontal driving or transmission shaft 12 is arranged parallel with the axis of the motor power shaft and journaled at its opposite ends in sets of spaced alined ball bearings 16 and 17 supported respectively within the end supports 4 and 5. As illustrated, secured, as by keys 18 adjacent the opposite ends of the shaft 12, are spur pinions 19 and 20, meshing with planetary drum driver gears 21, 21, each of which is journaled on spaced alined ball bearings 22 supported by stub shafts 23, 23. These shafts are arranged in parallel relation with their axes lying in a diametric plane including the axis of the shaft 12. The pairs of shafts 23, 23 are respectively carried by rope winding drums 24 and 25, as for instance, a haulage drum and a tail rope drum. The shafts are arranged in longitudinal bores 26 formed in the drum bodies and extend completely through the drums in the manner shown in Fig. 4. By extending the stub shafts 23 completely through their respective winding drums, it will be evident that an extremely stable support is provided for the planetary drum driver gears 21, 21. The drums 24 and 25 are arranged in coaxial relation between the end supports 4 and 5, and are each journaled on ball bearings 27, 28 supported by the transmission shaft 12. Suitably connected, as by a connection 29, to the rope drums 24 and 25, respectively, are haulage or drag line ropes 30 and 31. It will be noted that in this instance the gears 21, 21 mesh with internal gears 32 and 33 arranged at the remote drum ends and suitably secured to reaction members 34 and 35, respectively. Each of these reaction members is provided with a hub 36 journaled in a roller bearing 37 supported within the adjacent end support, these hubs 36 also forming the supports for the ball bearings 16 and 17. Each of the gear portions secured to the reaction members 34 and 35 are externally grooved at 38, and suitable brake bands 39 and 40 cooperate with the surfaces of the bottoms of these grooves in a manner to be later described. The adjacent drum ends are provided with braking surfaces 41 with which brake bands 42 and 43, respectively, cooperate. In accordance with this invention, the reaction members and their associated internal gear portions cooperate to form a chamber 44 within which the gears 19, 21, 21 are arranged, and this chamber is adapted to contain a lubricant bath for the gears. To provide a lubricant seal to prevent leakage of lubricant from the chamber 44, there is secured to the gear portions of the internal gears annular flanged members 45 having their inwardly directed flanged portions 46 cooperating with annular shoulders 47 formed on the drums.

A high pressure grease lubricating system is provided for the various bearings. The adjacent ends of the drums are each provided with a passage 48 communicating with a chamber 49 receiving the ball bearing 28, and lubricant is adapted to be supplied to the passage through a usual fitting 50. The adjacent drum ends are also provided with passages 51 each having a fitting 52 and communicating with an annular recess 53 formed on the shaft 23, and this recess is connected through a radial passage and an axial passage in the shaft 23 with the chamber 54 receiving the ball bearings 22. The opposite ends of the drive shaft 12 are provided with fittings 55 and 56, and the fitting 55 is connected through an axial passage and radial passages in the shaft 12 with the chambers receiving the bearings 16 and 27. The fitting 56 is similarly connected through axial and radial passages in the shaft 12 with the chambers receiving the ball bearings 17 and 27. The adjacent end faces of the drums are annularly grooved at 57 to receive a sealing ring 58 for preventing leakage of lubricant from the chambers receiving the bearings 28, out between the drum ends. Carried by the support 4 is a fitting 59 connected by a passage 60 communicating with the chamber receiving the roller bearing 37, while the support 5 is provided with a similar fitting 61 connected to the chamber receiving the roller bearing for the hub of the reaction member 35. The reaction members 34 and 35 each carry a fitting 62 connected by a passage 63 with the chambers 44 for supplying lubricant to these chambers. It will thus be seen that a high pressure grease system is provided whereby the various bearings may be properly lubricated, and by the provision of the flanged retaining members 45, leakage of lubricant from the chambers 44 is substantially prevented.

Encircling the drums are rope guards 64 and 65 for the drums 24 and 25, respectively, closely embracing the drum flanges, each of these guards being composed of two sections vertically split at 66 and secured together by bolts 67. Each of these guards is provided with depending bottom flanges 68 cooperating with vertical flanges 69 formed on the opposite sides of the base frame, and the flanges 68 are secured to the flanges 69 by screws 70. Each of these rope guards is provided with a top opening 71 and a bottom opening 72 through which the ropes wound on the drums may be extended, it being evident that the ropes may be extended from the bottoms of the drums through the openings 72 and from the tops of the drums through the openings 71. With the arrangement shown in Figs. 1, 2 and 3, the rope 30 of the haulage drum 24 extends from the top of the drum through the opening 71 in the guard 64, while the tail rope 31 on the tail rope drum 25 extends from the bottom of the drum through the opening 72 in the rope guard 65. It will be evident that if desired both ropes may be extended from either the bottoms or the tops of the drums 24, 25 simply by releasing the screws 70 and the bolt 67 to permit separate removal of the sections of one of the rope guards from the base frame and its associated drum, turning the rope guard into its opposite position and again securing the guard sections together

and to the base frame so that the openings 71, 72 may be on either side of the hoisting mechanism, or with one opening 71 on one side and the other opening 71 on the other side. It will thus be seen that the rope guards may be placed in any desired position with respect to the hoisting drums simply by the re-arrangement of the sections thereof to bring the cable openings 71, 72 in any desired location with respect to the drums.

Attached to the rope guards 64 and 65 are rope guides generally designated 73 and 74. These rope guides are preferably identical in design so that one may be readily substituted for the other, and both may be supported at the top or at the bottom of their respective guards. The flanges 75 of the rope guards are provided with threaded openings 76 adjacent the rope opening 72 and with similar threaded openings 77 adjacent the rope opening 71. The flanges 78 of the rope guide 74 are adapted to be secured to the guard flanges 75 by screws 79 threaded within the threaded openings 76, while the flanges of the frame of the rope guide 73 are adapted to be secured to the guard flanges by screws 80 threaded within the openings 77. The screws 80 may be removed from the threaded openings 77, the rope guide 73 detached from the rope guard, inverted and secured to the rope guard adjacent the opening 72 by the bolts 80 engaging the opening 76 in the rope guard, thereby to bring both of the rope guides adjacent the openings 72 of the guards at the bottoms of the drums. Conversely, the rope guide 74 may be detached from the rope guard, inverted and attached to the rope guard adjacent the opening 71 so that both of the rope guides are arranged adjacent the openings 71 in the guards at the tops of the drums. As previously mentioned, the positions of the guards may be reversed with respect to their hoisting drums so that both of the rope guides are arranged at either the tops or the bottoms of the drums at the opposite sides of the drums, as indicated in dotted lines in Fig. 3. Each of these rope guides 73, 74 comprises a frame 81 supporting parallel vertical shafts 82 on which are journaled vertical rollers 83 and supporting parallel horizontal shafts 84 on which are journaled horizontal rollers 85.

The improved braking means for the drum drive control means and the drum braking means will now be described. As shown in Fig. 8, the brake band 39 has its bottom portion secured to the base frame by means of members 86 riveted to the band, and each of these members has a projecting lug (see Figs. 10, 11 and 12) 87 fitting a slot 88 formed in a block 89. This block 89 is detachably secured by a screw 90 to a bracket 91 in turn bolted to the base frame 1. When it is desired to remove the brake band, it is detached from its operating connections and the blocks 89, upon removal of the screws 90, slid outwardly to release the lugs 87 from the slots 88, thereby permitting lateral release of the brake band from its cooperating brake element. Detachably secured, as by screws 92, to the rope guards 64 and 65 are brackets 93 and 94, and rotatably mounted in the bracket 94 is a tubular rod 95, while extending through this tubular rod and rotatably mounted in the bracket 93 is an operating rod 96. Fixed to the adjacent extremities of the rods 95, 96 are end control levers 97 and 98, respectively. It will be evident that these levers 97 and 98 may be arranged to extend downwardly as shown, or to extend upwardly in the opposite direction, the rod having provision for attaching the levers in either position. Fixed to the opposite end of the rod 96 is a lever 99 pivotally connected to a link 100, in turn pivotally connected to a lever 101. The lever 101 is pivotally connected to one end of the brake band 39, while pivotally connected at 102 to the opposite end of the brake band is an adjustable tie rod 103, in turn pivotally connected at 104 to the lever 101. It will be evident that when the lever 101 is swung downwardly from its position shown in Fig. 8, the ends of the brake band are drawn together by the connection 101, 103. Keyed to the rod 96 at the opposite side of the bracket 93 with respect to the lever 99 is a two-part lever 105 engaging at 106 one end of a rod 107 fixed to one end of the brake band 42, while the opposite end of the brake band is secured by a bolt 108 to the bracket 93. Secured to the tubular rod 95 are similar levers 109 and 110 connected through similar operating connections to the brake bands 40 and 43. It will thus be seen that when the lever 98 is operated to rotate the rod 96 in one direction, the brake band 39 is applied, while the brake band 42 is released, and when the lever 98 is swung to turn the rod 96 in the opposite direction the brake band 42 is applied while the brake band 39 is released. The brake bands 40 and 43 are operated in the same manner by the lever 97 for the operating rod 95. These end control levers may be transposed to the opposite sides of the hoisting mechanism simply by detaching the brackets 93, 94 from one side of the rope guards and transferring them to the other side thereof, as indicated in dotted lines in Fig. 3, and by reversing the position of the operating connections for the brake bands. By the provision of structure whereby the operating connections may be transferred to either side of the machine, it is possible to control the hoisting drums from either side of the machine.

In the modified form of construction shown in Figs. 15 to 19, inclusive, the control rods, their operating levers and the associated control means have been supplanted by side lever control means for the drum drive control means and foot pedal control means for the drum braking means. Also in this form of the invention the ropes are extended from the bottoms of the drums through the bottom openings 72 of the rope guards at the same side of the machine, and the rope guides 73, 74 are connected to the rope guards adjacent the bottom opening 72. The top openings 71, when the parts are so arranged, are closed by suitable sheet metal covers, and the threaded openings in the rope guards for receiving the attaching bolts for the end lever brackets 92, 93 have threaded therein screws 115 for attaching plates 116 to the guards for bracing the latter. As in the form of the invention shown in Figs. 1, 2 and 3, the rope guards may be reversed with respect to the drums and the rope guides 73, 74 may be attached, if desired, adjacent the top guide openings 71 or the bottom guide openings 72, as indicated in dotted lines in Fig. 17. In this instance, the operating means for the brake bands 39, 40 includes side operating members 117 and 118, respectively, each pivotally connected at 119 to one end of the brake band and through an adjustable link 120 to the other end of the brake band so that when these side levers are swung downwardly toward the drums, the ends of the brake band are drawn together to apply the brake. The brake bands 42, 43 of the drum brakes are operated by foot pedals 121 and 122, respectively, and each of these foot

pedals is pivotally connected at 123 to the adjacent rope guard. One end of the brake band is adjustably threadedly connected at 124 to an eye bolt 125 pivotally connected at 126 to the foot pedal, while the opposite end of the brake band is connected through a member 127, in turn connected to the pivot pin for the foot pedal. Coil springs 128 connected between each foot pedal and a flange of the rope guard urge the foot pedals toward their released position. When the foot pedals are pressed downwardly the brake bands are tightened. As indicated in dotted lines in Fig. 17, the side operating handles 117 and 118 and their operating connections may be reversed with respect to the drums as also can be the foot pedals and their operating connections, so that the hoisting drums may be controlled from either side of the machine. Otherwise this form of the invention is similar to that shown in Figs. 1, 2 and 3.

The mode of operation of the improved hoisting mechanism will be clearly apparent from the description given. It will be noted that when the motor 7 is running, the transmission shaft 12, and consequently the drive pinions 19 and 20, are rotated, though the winding drums 24 and 25 loosely journaled on this shaft 12 may be idle if the brake bands 39 and 40 controlling the reaction members 34 and 35 are released so that the reaction members may freely rotate in their respective bearings. If it is desired to rotate the drum 24 to wind in the cable 30, the brake band 39 controlling rotation of the reaction member 34 is applied, consequently preventing rotation of the internal gear 32. The drive pinion 19 then causes the planetary gears 21, 21 to roll around the internal gear 32 as a trackway and move with them, the winding drum 24. The winding drums 25 at that time pay out the cable 31 cooperating therewith, the reaction member 36 being freely rotatable at this time under the control of the brake band 43 which acts as a "spinning" brake to prevent too rapid rotation of the drum, and consequently too rapid unwinding of the rope 31. If it is desired to rotate the drum 25 and wind in the cooperating cable 31 and to pay out the cable 30 cooperating with the drum 24, the brake band 39 controlling the reaction member 34 is released, permitting rotation of the drum 24. The brake band 40 controlling rotation of the reaction member 35 is then applied and the internal gear 33 held stationary, the pinion 20 then causing the planetary gears 21, 21 to roll around the internal gear 33 as a trackway and causing the drum 25 to revolve therewith. At this time the "spinning" brake 42 controls too rapid rotation of the drum 24. It will therefore be evident that through suitable application of the brake bands 39 and 40 the drums 24 and 25 may be selectively or simultaneously positively driven from the motor 7, and that when the brake bands 39 and 40 are released, the winding drums 24 and 25 may remain idle during running of the motor and that rotation of the drums 24 and 25 in a direction to pay out their respective cables may be controlled by the "spinning" brakes 42 and 43.

When the rope guards 64, 65 are in the position shown in Figs. 1, 2 and 3, the rope on the drum 25 is extended from the bottom of the drum through the opening 72 in the guard 65 and is guided by the guiding means 74, while the rope 30 is extended in the opposite direction from the top of the drum 24 through the opening 71 in the guard 64 and is guided by the rope guide 73. When it is desired to extend both of the ropes 30, 31 in the same direction from the bottoms of the drums 24 and 25, through the openings 72 in the guards 64, 65, the guide 73 is detached from the guard 64, inverted and reattached to the guard adjacent the opening 72 on the same side of the hoisting mechanism as the rope guide 74. When it is desired to extend both ropes 30, 31 in the same direction from the bottoms of the drums 24 and 25, through the openings 72 in the guards 64, 65, the guide 73 is detached from the guard 64, inverted and re-attached to the guard adjacent the opening 72 on the same side of the hoisting mechanism as the rope guide 74. When it is desired to extend both ropes 30, 31 from the tops of the drum 24, 25 through the openings 71 in the rope guards, the rope guide 74 is detached from the guard 65, inverted, and then re-attached to the guard adjacent the opening 71 at the same side of the machine as the rope guide 73. Either of the rope guards 64, 65 may be detached from the hoisting mechanism, their position reversed with respect to the hoisting drums and then again attached in position so that the rope 31 on the drum 25 may be extended from the top of the drum through the opening 71 in the guard 65, while the rope 30 on the drum 24 may be extended from the bottom of the drum through the opening 72 in the guard 64, the rope guides 73, 74 being attached at these openings 71, 72 to guide the cables when they are so extended. If it is desired to operate the control means for the hoisting drum from the opposite side of the machine the control means are detached from one side of the machine and transferred to the other side thereof. The operation of the hoisting mechanism shown in Figs. 15 to 19, inclusive, is similar to that above described, except in this instance the brake bands are controlled by side levers 117, 117 and foot pedals 121, 122, and, as in the form of the invention above described, these side levers and foot pedals may be transferred to the opposite side of the machine when desired. The structure of the hoisting mechanism, the rope guard and guide structure of this form of the invention is identical to the form of the invention shown in Figs. 1, 2 and 3 and may be re-arranged with respect to the hoisting drums in the same manner.

As a result of this invention, it will be noted that an improved hoisting mechanism of the scraper mucking or so-called "slushing" type is provided having improved interchangeable and transferable arrangements for the rope guides and the operating means for the drum drive control means and the drum braking means whereby a single hoisting unit, but by simple change in parts, may be used to meet the varying conditions encountered in scraper loading work. It will further be noted that an improved hoisting mechanism is provided having improved drum driving means, improved control means and improved lubricating means for the drum driving means, the improved lubricating means embodying an improved lubricant seal for certain elements of the drum driving gearing. It will further be evident that by the provision of the improved rope guards and rope guiding means and the transposable arrangement of the control levers, the hoisting mechanism may operate either as a right hand or left hand machine, the motor may be rotated in either of opposite directions and the ropes may be extended from the drums in various manners. These and other uses and advantages of the improved hoisting mechanism will be clearly apparent to those skilled in the art.

While I have in this application specifically de-

scribed one form which my invention may assume in practice, and certain modifications thereof, it will be understood that this form of the same is shown for purposes of illustration, and that the invention may be further modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a hoisting mechanism, a frame, a rope drum rotatably mounted on said frame, and a rope guard mounted on said frame and at least partially surrounding said drum, said guard having lateral openings respectively on one side thereof near the top of said drum and on the other side thereof near the bottom of said drum whereby the free end of a rope wound upon the drum may be extended from the top of said drum through one opening and from the bottom of said drum through the other opening.

2. In a hoisting mechanism, a frame, a rope drum rotatably mounted on said frame, a rope guard mounted on said frame and at least partially surrounding said drum, said guard having openings respectively on one side thereof near the top of said drum and on the other side thereof near the bottom of said drum whereby a rope may be extended from the top of said drum through one opening and from the bottom of said drum through the other opening, and a rope guide attachable to said guard adjacent either of said openings for guiding the rope when extended through either opening.

3. In a hoisting mechanism, a frame, a rope drum rotatably mounted on said frame, and a rope guard mounted on said frame and at least partially surrounding said drum, said guard having openings respectively on one side thereof near the top of said drum and on the other side thereof near the bottom of said drum whereby a rope may be extended from the top of said drum through one opening and from the bottom of said drum through the other opening, said rope guard being reversible in position with respect to said drum so that said openings may be located at either side of said drum.

4. In a hoisting mechanism, a frame, a rope drum rotatably mounted on said frame, a rope guard mounted on said frame and at least partially surrounding said drum, said guard having openings respectively on one side thereof near the top of said drum and on the other side thereof near the bottom of said drum whereby a rope may be extended from the top of said drum through one opening and from the bottom of said drum through the other opening, said rope guard being reversible in position with respect to said drum so that said openings may be located at either side of said drum, and a rope guide attachable to said guard adjacent either of said openings for guiding the rope when extended selectively through either opening in either position of said guard.

5. In a hoisting mechanism, a frame, a rope drum rotatably mounted on said frame, and a rope guard mounted on said frame and at least partially surrounding said drum, said guard being made in two parts bolted together, one part having an opening near the top of said drum and the other part having an opening near the bottom of said drum whereby a rope may be extended from the top of the drum through one opening and from the bottom of said drum through the other opening.

6. In a hoisting mechanism, a frame, a rope drum rotatably mounted on said frame, and a rope guard mounted on said frame and at least partially surrounding said drum, said guard being made in two parts bolted together, one part having an opening near the top of said drum and the other part having an opening near the bottom of said drum whereby a rope may be extended from the top of the drum through one opening and from the bottom of said drum through the other opening, and a rope guide attachable to either part of said guard adjacent either of said openings for guiding the rope when extended through either opening.

7. In a hoisting mechanism, a frame, relatively rotatable rope drums mounted on said frame, and a pair of rope guards, one for each drum, mounted on said frame and encircling said drums respectively, each of said guards having an opening at one side thereof near the top of the drum and an opening at the other side thereof near the bottom of the drum whereby ropes may be extended from the top of either drum through the top openings and from the bottom of either drum through the bottom openings, and a pair of rope guides, one for each guard, and attachable to each guard near either opening thereof for guiding the rope when extended through either opening.

8. In a hoisting mechanism, a frame, a rope drum rotatably mounted on said frame, a rope guard mounted on said frame and at least partially surrounding said drum and having an opening through which the rope may be extended from said drum, drum driving means, drum braking means, and control means for said drum driving means and said drum braking means including control elements mounted on said guard, said control elements being transposable to either side of said guard whereby the drum may be controlled from either side thereof.

9. In a hoisting mechanism, a frame, relatively rotatable rope drums mounted on said frame, and a pair of rope guards, one for each drum, mounted on said frame and surrounding said drums, respectively, each of said guards having an opening at one side near the top of its drum and on the other side near the bottom of its drum whereby the ropes may be extended from the tops of said drums through the top openings and from the bottoms of said drums through the bottom openings.

10. In a hoisting mechanism, a frame, relatively rotatable rope drums mounted on said frame, and a pair of rope guards, one for each drum, mounted on said frame and surrounding said drums, respectively, each of said guards having an opening at one side near the top of its drum and on the other side near the bottom of its drum whereby the ropes may be extended from the tops of said drums through the top openings and from the bottoms of said drums through the bottom openings, said guards being detachable from said frame for reversal in position with respect to their drums whereby the ropes may be extended from the drums from either side thereof.

11. In a hoisting mechanism, a frame, relatively rotatable rope drums mounted on said frame, a pair of rope guards, one for each drum, mounted on said frame and surrounding said drums, respectively, each of said guards having an opening at one side near the top of its drum and on the other side near the bottom of its drum whereby the ropes may be extended from the tops of said drums through the top openings and

from the bottoms of said drums through the bottom openings, and a pair of rope guides, one for each guard attachable to its guard adjacent either of said guard openings for guiding the ropes when extended through either of said guard openings.

12. In a hoisting mechanism, a frame, relatively rotatable rope drums mounted on said frame, a pair of rope guards, one for each drum, mounted on said frame and surrounding said drums, respectively, each of said guards having an opening at one side near the top of its drum and on the other side near the bottom of its drum whereby the ropes may be extended from the tops of said drums through the top openings and from the bottoms of said drums through the bottom openings, said guards being detachable from said frame for reversal in position with respect to their drums whereby the ropes may be extended from the drums from either side thereof, and a pair of rope guides, one for each guard, attachable to its guard adjacent either of said guard openings for guiding the ropes when extended through either of said guard openings.

13. In a hoisting mechanism which comprises a guarded drum, a drum guard comprising a cylindrical member encircling the drum and having opposed lateral rope openings, one near the top thereof and the other near the bottom whereby a rope wound on the drum may be extended laterally from the top of the drum through the top opening and from the bottom of the drum through the bottom opening.

14. In a hoisting mechanism which comprises a guarded drum, a drum guard comprising a cylindrical member encircling the drum and having opposed lateral rope openings, one near the top thereof and the other near the bottom whereby a rope wound on the drum may be extended laterally from the top of the drum through the top opening and from the bottom of the drum through the bottom opening and having means adjacent either opening adapted for the attachment of rope guiding means.

15. In a hoisting mechanism which comprises a guarded drum, a rope drum guard comprising a circular guard member encircling the drum and composed of two identical parts bolted together, one part having a rope opening near the top thereof and the other having a rope opening at its bottom whereby a rope may be extended from the drum guarded thereby in one direction through one opening and in the opposite direction through the other opening.

16. In a hoisting mechanism, a frame, a rope drum rotatably mounted on said frame, a motor on said frame, drum supporting means on said frame comprising an end support, driving gearing connecting said motor to said drum, said supporting means having a recess extending inwardly from the outer surface of said end support, a cover attached to the outer surface of said support and having a recess cooperating with said recess to form a lubricant chamber for elements of said gearing, said gearing elements having portions arranged in said end support recess.

17. In a hoisting mechanism, a frame, a rope drum journaled on said frame, a motor on said frame, drum driving means including a reaction member, an internal gear secured to said reaction member, a driving gear, a gear carried by the drum and meshing with said driving gear and said internal gear, said reaction member and internal gear providing a lubricant chamber in which said gears are arranged, and a member secured to said reaction member and having an inwardly directed annular portion cooperating with said drum for providing a lubricant seal.

18. In a hoisting mechanism, a frame, a rope drum journaled on said frame and having an annular shoulder, a motor on said frame, drum driving means including a reaction member, an internal gear secured to said reaction member, a driving gear, a gear carried by the drum and meshing with said driving gear and said internal gear, said reaction member and internal gear providing a lubricant chamber in which said gears are arranged, and an annular member secured to said reaction member and having an inwardly directed annular flange cooperating with the annular shoulder on said drum for providing a lubricant seal.

19. In a hoisting mechanism, a frame, a rope drum journaled on said frame, a motor on said frame, drum driving means including a reaction member, an internal gear secured to said reaction member, a driving gear, a gear carried by the drum and meshing with said driving gear and said internal gear, said reaction member and internal gear providing a lubricant chamber in which said gears are arranged, and a member secured to said reaction member and having an inwardly directed annular portion cooperating with said drum for providing a lubricant seal, said annular portion providing an inner end wall for said lubricant chamber.

20. In a hoisting mechanism, a frame, a rope drum journaled on said frame and having an annular shoulder, a motor on said frame, drum driving means including a reaction member, an internal gear secured to said reaction member, a driving gear, a gear carried by the drum and meshing with said driving gear and said internal gear, said reaction member and internal gear providing a lubricant chamber in which said gears are arranged, and an annular member secured to said reaction member and having an inwardly directed annular flange cooperating with the annular shoulder on said drum for providing a lubricant seal, said annular flange providing an inner end wall for said lubricant chamber.

21. In a hoisting mechanism, a frame, a rope drum journaled on said frame, drum driving means including a reaction member, an internal gear secured to said reaction member, a driving gear, a gear carried by said drum and meshing with said driving gear and said internal gear, said reaction member and internal gear providing a lubricant chamber in which said gears are arranged, and a member secured to said reaction member and having an annular flange forming a wall of said lubricant chamber and at its inner periphery cooperating with a cylindrical surface on said drum for providing a lubricant seal.

22. In a hoisting mechanism, a frame, a rope drum journaled on said frame and having an annular shoulder formed on a cylindrical portion of the drum, drum driving means including a reaction member, an internal gear secured to said reaction member, a driving gear, a gear carried by said drum and meshing with said driving gear and said internal gear, said reaction member and internal gear providing a lubricant chamber in which said gears are arranged, and an annular member secured to said reaction member and having an annular flange forming a wall of said lubricant chamber and at its inner periphery cooperating with said annular shoulder on said drum for providing a lubricant seal.

23. In a hoisting mechanism, a frame, a rope

drum rotatably mounted on said frame, and a rope guard mounted on said frame and at least partially surrounding said drum, said guard having lateral openings, one opening through one side of said guard near the top of said drum and the other opening through the other side of said guard near the bottom of said drum whereby the free end of a rope wound upon the drum may be extended from the top of the drum through one opening and from the bottom of the drum through the other opening, said frame having attaching means at its opposite sides for attaching said guard thereto, and said guard having depending bottom flanges at its opposite sides and secured to the opposite sides of said frame by said attaching means.

24. In a hoisting mechanism, a frame, a rope drum rotatably mounted on said frame, a rope guard mounted on said frame and at least partially surrounding said drum, said guard having lateral openings, one opening through one side of said guard near the top of said drum and the other opening through the other side of said guard near the bottom of said drum whereby the free end of a rope wound upon the drum may be extended from the top of the drum through one opening and from the bottom of the drum through the other opening, said guard having attaching means adjacent each rope opening for attaching a rope guide thereto, and a rope guide attachable to said guard by said attaching means adjacent either of said openings for guiding the rope when extended through either opening.

25. An article of manufacture, for use in a hoisting mechanism having a guarded drum, comprising a drum guard at least partially surrounding the drum when incorporated in the hoisting mechanism and having opposed lateral rope openings, one opening near the top of the guard and the other near the bottom thereof whereby a rope wound on the drum may be extended laterally from the top of the drum through one opening and from the bottom of the drum through the other opening, and attaching means on said guard adjacent each rope opening for a rope guide.

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